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09/848,896	05/04/2001	Stephen Ernest Jacobson	CH2714 US NA	8728

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EXAMINER

VANOY, TIMOTHY C

ART UNIT	PAPER NUMBER
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1754

DATE MAILED: 04/10/2003

5

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/848,896

Applicant(s)

JACOBSON et al.

Examiner

VANOY

Group Art Unit

1754

— The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address —

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE THREE MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

☒ Responsive to communication(s) <sup>mailed</sup> filed on MARCH 12, 2003

☒ This action is **FINAL**.

- ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

☒ Claim(s) 1 AND 3-10 is/are pending in the application.

Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

☐ Claim(s) \_\_\_\_\_ is/are allowed.

☒ Claim(s) 1 AND 3-10 is/are rejected.

☐ Claim(s) \_\_\_\_\_ is/are objected to.

☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement

## Application Papers

☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119 (a)-(d)

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119 (a)-(d).

☐ All ☐ Some\* ☐ None of the:

☐ Certified copies of the priority documents have been received.

☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_

☐ Copies of the certified copies of the priority documents have been received

in this national stage application from the International Bureau (PCT Rule 17.2(a))

\*Certified copies not received: \_\_\_\_\_

## Attachment(s)

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). \_\_\_\_\_

☐ Interview Summary, PTO-413

☐ Notice of Reference(s) Cited, PTO-892

☐ Notice of Informal Patent Application, PTO-152

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Other \_\_\_\_\_

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## DETAILED ACTION

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

The person having "ordinary skill in the art" has the capability of understanding the scientific and engineering principles applicable to the claimed invention. The references of record in this application reasonably reflect this level of skill.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1 and 3-10 are again rejected under 35 U.S.C. 103(a) as being unpatentable over U. S. Pat. 5,223,237 in view of the reference titled "Study of Absorption of sulfur oxides by zeolites" by Anurov et al.

U. S. Pat. 5,223,237 describes at least an obvious variation of the same process for removing sulfur dioxide and/or sulfur trioxide out a gas (please see col. 4 lns. 30-34), comprising:

passing the sulfur oxides-contaminated gas through a zeolite, which may be mordenite (which has a Si:Al ratio of 5:1: please see col. 2 lns. 21-22 and also col. 3 lns. 63-65 in U. S. Pat. 5,223,237) so that the sulfur oxides are sorbed into the zeolite (please also see col. 4 lns. 25-29) at temperatures that are described as being "relatively low" and "on the order of 25 °C" (please also see col. 6 lns. 54-56) and also at (evidently) atmospheric pressure;

purging the sorbed sulfur oxides out of the zeolite by passing a gas at a temperature of about 300 °C through the zeolite so that the gas removes the sulfur oxides out of the zeolite, thereby producing a regenerated zeolite and a sulfur oxides-loaded gas (please also see col. 5 lns. 26-68), and

repeating the above "passing" and "purging" steps above in a cyclical fashion (please see the operation of the process illustrated in Fig. 1 in U. S. Pat. 5,223,237).

Note that the disclosure set forth in col. 3 lns. 31-32 that zeolites (generally) have pore diameters ranging from 4 to 10 Angstroms, fairly suggests the claimed pore diameter of at least 0.5 nm.

This description of U. S. Pat. 5,223,237 is submitted to render obvious the limitations of at least Applicants' claim 1, in as much as there is no unobvious distinction between the zeolite and regeneration gases of U. S. Pat. 5,223,237 and the "sorber", "user" and "provider" of Applicants' claim 1.

The difference between the applicants' claims 1 and 8 and U. S. Pat. 5,223,237 is that applicants' claims 1 and 8 set forth that the Si to Al ratio in the zeolite is greater than 5.1.

The article titled "Study of Absorption of Sulfur Oxides by Zeolites" by Anurov et al. in its Table I shows a mordenite from Azerbaijan having a Si:Al ratio of 9.20:1.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made *to use* a zeolite that has a Si:Al ratio that is greater than 5.1 for the zeolites used in the process of U. S. Pat. 5,223,237, in the manner set forth in applicants' claims 1 and 8, *because* the disclosure set forth on Table I in the Anurov et al. reference is evidence (and, therefore, renders obvious) that the "mordenite" set forth in col. 2 lns. 21-22 in U. S. Pat. 5,223,237 *includes* mordenites that have a Si:Al ratio higher than the 5.1:1, as set forth in the applicants' claims 1 and 8.

The difference between the Applicants' claims and U. S. Pat. 5,223,237 is that Applicants' claims 1, 3 and 4 require the treatment of a gas containing from 15 to 100% sulfur trioxide, and Applicants' claim 5 requires that the amount of sulfur trioxide sorbed

on the sorbent ranges from 3 to 60 weight percent (whereas the process of U. S. Pat. 5,223,237 typically treats a flue gas: please see col. 9 ln. 50, and please note that Example 1 describes a sulfur dioxide concentration of 2000 ppm) - additionally, Applicants' claim 1 sets forth that the contacting is conducted under anhydrous conditions (whereas the process of U. S. Pat. 5,223,237 appears to treat a water-containing gas in as much as flue gases may typically contain some water - especially if they are emitted from a combustor).

The disclosure set forth in col. 3 lns. 56-62 and col. 4 lns. 25-34 in U. S. Pat. 5,223,237 *that* a variety of zeolites, to include the mordenites embraced in the scope of the Applicants' claims, can sorb "sulfur oxides gases" (which is defined to include sulfur dioxide and sulfur trioxide) fairly suggests to one skilled in the art that the claimed zeolites can sorb sulfur trioxide at any concentration in the gas (to include the 15 to 100% reported in Applicants' claim 1). Additionally, the disclosure set forth in col. 4 lns. 15-16 in U. S. Pat. 5,223,237 that all zeolites preferably sorb water over sulfur oxide gas fairly suggests to one skill in the art that the sulfur trioxide-containing feed gas should be free from water because it competes with the sulfur trioxide as a component to be sorbed into the zeolite.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made *to apply* the process described in U. S. Pat. 5,223,237 *to treat* anhydrous gas containing from 15 to 100 percent sulfur trioxide, in the manner required by at least Applicants' claim 1, *because* the disclosures set forth in col. 3 lns. 56-62 and also in col. 4 lns. 25-34 fairly suggest this utility for their zeolites, consistent

with the discussion of the *Sinclair & Carroll Co. vs. Interchemical Corp.* 325 U. S. 327, 65 USPQ 297 court decision set forth in section 2144.07 in the MPEP (8<sup>th</sup> ed.) where it was determined that the selection of a known material based on its suitability for its intended use supported a *prima facie* obviousness determination.

Additionally, note that it is fully expected that the zeolite resulting from the treatment of a gas containing from 15 to 100% sulfur trioxide will inherently have from 3 to 60 percent by weight of sulfur trioxide loaded on it as set forth in Applicants' claim 5 and at least 1% by weight of sulfur trioxide loaded on it as set forth in Applicants' claim 8.

The difference between the Applicants' claims and U. S. Pat. 5,223,237 is that Applicants' claim 1 sets forth that sorption temperatures range from 35 to 150 °C and Applicants' claim 6 sets forth that the sorption temperatures range from 50 to 125 °C.

The paragraph bridging pages 2 and 3 and the paragraph bridging pages 3 and 4 in the Anurov reference fairly teaches that zeolites can sorb sulfur trioxide out of a gas at temperatures ranging from 20 to 150 °C.

It would have been obvious to one of ordinary skill in the art at the time the invention was made *to further describe* the temperature at which the zeolites of U. S. Pat. 5,223,237 can sorb sulfur trioxide out of a gas as ranging from 35 to 150 °C, as set forth in at least Applicants' claims 1 and 8, *because* the disclosure set forth on pgs. 2-4 in the Anurov reference fairly teaches and suggests that zeolites can sorb sulfur trioxide out of a gas at these claimed temperatures: please see discussion of the court decisions set forth in section 2144.05(I) in the MPEP (8<sup>th</sup> ed.).

The difference between the Applicants' claims and U. S. Pat. 5,223,237 is that Applicants' claims 7 and 9 set forth that the zeolite used has a Si:Al ratio of at least 25, whereas the claims set forth in U. S. Pat. 5,223,237 call for the use of zeolites generically to sorb the sulfur trioxide.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to *preferentially use* the particular species of zeolites having Si:Al ratio of at least 25 as the broad and generic "zeolite" recited in the claims of U. S. Pat. 5,223,237 in the process of sulfur trioxide sorption obvious from U. S. Pat. 5,223,237, in the manner set forth in the Applicants' claims, *because* the courts have already determined that a claim drawn to a specific compound is anticipated by a prior art reference teaching a generic formula embracing a limited number of compounds closely related to each other in structure and properties: please see the discussion of the *In re Schauman* 572 F.2d 312, 197 USPQ 5 (CCPA 1978) court decision set forth in section 2131.02 in the MPEP (8<sup>th</sup> ed.) for further details.

Note that no distinction is seen or has been shown (or is expected) between the physical form of the zeolites of U. S. Pat. 5,223,237 and the physical form of the zeolite described in Applicants' claim 10.

The limitation set forth in applicants' claim 1 setting forth that the sulfur trioxide is sorbed out of an inert gas is noted, but appears to be met and rendered obvious by the combustion off-gas that the process of U. S. Pat. 5,223,237 treats.

The limitations set forth in applicants' claim 1 setting forth that the sorbent is capable of storage and the sorbent has structural stability are noted, but the same



sorbents from the applied references are expected to inherently have these same qualities.

### ***Response to Arguments***

The applicants' arguments submitted in their amendment dated March 12, 2003 (paper no. 4) have been considered, but are not persuasive.

a) *The applicants argue that their gas stream has to be anhydrous, however U. S. Pat. 5,223,237 in col. 6 Ins. 21-32 reports the use of water to purge the sulfur oxides sorbed in the zeolite. U. S. Pat. 5,223,237 uses conditions that result in degradation of their zeolites. The only teaching in U. S. Pat. 5,223,237 relating to preventing reduction in bed sorption capacity is (the teaching) to minimize the sulfur oxide residence time on the sorbent (col. 9 Ins. 56-61 in U. S. Pat. 5,223,237). U. S. Pat. 5,223,237 does not teach or suggest that (the) use of anhydrous conditions are desirable. U. S. Pat. 5,223,237 discloses that the use of a water purge is superior to achieve a brief desorption period (col. 9 Ins. 1-8 in U. S. Pat. 5,223,237). U. S. Pat. 5,223,237 does not teach any means to avoid reduction of the sorption capacity of the sorbent other than short residence time of the sulfur oxides on the sorbent. This is directly contrary to the purpose of the applicants' invention (see pg. 8 Ins. 22-24 and pg. 9 Ins. 4-11 in the Applicants' specification).*

As mentioned in the 103 rejection, the disclosure set forth in col. 4 Ins. 15-16 in U. S. Pat. 5,223,237 that all zeolites preferably sorb water over sulfur oxide gas fairly suggests to one skill in the art that the sulfur trioxide-containing feed gas should be free

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from water because it competes with the sulfur trioxide as a component to be sorbed into the zeolite. The applicants' argument seems to have dismissed this fact.

Obviously, once the water is removed from the feed gas, the same argued avoidance of shortening the reduction capacity of the zeolite is expected to be avoided. In any event, the disclosure set forth in col. 5 lns. 19-21 in U. S. Pat. 5,223,237 fairly suggests that the gas being treated is also free from water.

b) *The applicants argue that fig. 3 in the Anurov et al. reference depicts a graph that shows the adsorbent activity decreases with the number of cycles. This is attributed to the formation of aluminum sulfate, which dealuminizes the zeolites and leads to destruction of their crystal lattice and decreases the adsorptive capacity. In comparison, Applicants' fig. 1 shows no deterioration of the sorbent molecular structure over 10 cycles.*

The applicants' argument did not rebut or challenge the manner in which the 103 rejection relied on the Anurov et al. article to render obvious the temperature limitations of applicants' claims 1 and 6 in the paragraph bridging pgs. 2 and 3 and also the paragraph bridging pages 3 and 4 in the Anurov et al. article. Arguments directed to the preservation of sorbent activity are not germane to the manner in which the Anurov article is applied to meet temperature limitations.

c) *The applicants argue that neither U. S. Pat. 5,223,237 or the Anurov reference discloses the sorption of sulfur trioxide alone. A process for the sorption and desorption of sulfur dioxide, or a mixture of sulfur trioxide and sulfur dioxide does not suggest an effective process for the sorption and desorption of sulfur trioxide alone.*

In complete contrast to the applicants' argument, the disclosure in U. S. Pat. 5,223,237 that zeolites, to include mordenites, can cyclically sorb and desorb sulfur oxide gases out of a gas, wherein the "sulfur oxide gases" include both sulfur dioxide and sulfur trioxide (please see col. 2 lns. 44-53 and col. 4 lns. 11-17 and lns. 30-34 in U. S. Pat. 5,223,237) *does* fairly suggest that the process described in U. S. Pat. 5,223,237 (and obvious variations thereof) can successfully sorb and desorb sulfur trioxides out of a gas with a zeolite sorbent in a cyclical fashion. The applicants' argument has not provided a single piece of evidence to the contrary, and the speculation concerning the relative acidities of sulfur dioxide and sulfur trioxide is not evidence: please see the discussion of the *In re Schulze* 346 F.2d 600, 602, 145 USPQ 716, 718 (CCPA 1965) court decision set forth in section 2145(I) in the MPEP (8<sup>th</sup> ed.) for further details.

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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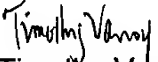
the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

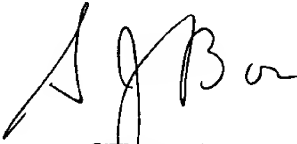
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy C. Vanoy whose telephone number is 703-308-2540. The examiner can normally be reached on 8 hr. days.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman, can be reached on 703-308-3837. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

Timothy Vanoy/tv  
April 7, 2003

  
Timothy Vanoy  
Patent Examiner  
Art Unit 1754

  
**STEVEN BOS**  
**PRIMARY EXAMINER**  
**GROUP 1100**